

# PALEONTOLOGICAL RESOURCES

Paleontological resources within the planning area are world renowned. Fossil localities in the Blue Mountain portion of the basin occur as steep, highly eroded 'badlands' dotting the canyon walls from river to rim. The rocks of the John Day basin have a high potential to produce important fossil localities. One hundred million years of ancient life are represented within the John Day basin. Specimens include 25 foot long marine reptiles from 90-95 million years ago to mammoths from the end of the Pleistocene Period (about 20,000 years ago). The most prominent time period represented in the basin is the Cenozoic Era or the Age of Mammals (65 million years ago [mya] to present). The John Day basin has one of the most complete rock sequences in the world for the period between 54 mya to 5 mya. Fossil preservation is excellent in the basin. Less known but equally important are geologic processes frozen in time within the basin. Examples include, stream and river channels, volcanic mud flows, lava infilling (of existing landscapes), and large volcanic ashfall events. This sequence is punctuated by volcanic tuffs sandwiched between old soils (paleosols) that can be reliably dated. The combination of long sequence, datable rocks, and good fossil preservation has made the John Day basin one area (known as a reference area) paleontologist/geologists use for understanding the ecologic changes seen in other areas of the US or the world with no or little control for time.

Understanding the importance of the fossil record in the John Day Basin, Congress authorized the John Day Fossil Beds National Monument in 1974. The monument consists of three separate units, Sheep Rock, Painted Hill and Clarno. These three units were established in the John Day basin specifically to highlight the critically important fossil and geologic resources of the time period between 45-5 million years ago.

Fossils on public lands are considered "a fragile and nonrenewable scientific record of the history of life on earth, and so represent an important and critical component of America's natural heritage". There are three main types of fossil resources, vertebrate (representing animals with backbones), invertebrate (animals without backbones) and botanical (leaves and wood). Trace fossils represent a rare fourth type consisting of skin impressions or trackways. Locations on the ground where fossils occur are known as localities, not sites. Geologic settings may also constitute a paleontological resource when associated with fossils or significant processes that created contexts for fossil preservation.

Fossils are associated with areas of land that have no or very little vegetation and expose the underlying rock layers. Sometime this is in small areas measured in square feet or larger areas encompassing many acres. Each exposure may or may not produce fossils. This is a characteristic of the preservation of large landscapes and what portion of that landscape is exposed to view. Not all parts of the ancient landscape had features that are necessary for animals or plants to become preserved. Exposures with fossils are known as localities. Some exposures are steep in nature like in the upper John Day river canyon, while others may be more in a horizontal position as exhibited in the plains adjacent to the Columbia River.

Fossil localities are scattered differentially throughout the John Day basin. What type and age of fossil one finds depends on your position in the canyon. Most fossil resources from the Tertiary Period (54 to 5 mya within the planning area are found between Thirtymile Creek in the lower John Day River canyon and Monument on the North Fork and around Dayville along the South Fork of the John Day River. Many of the better known localities are associated with and surround the John Day Fossil Beds National Monument and contribute significantly to filling in gaps in the rock sequence not exhibited on the park.

Between Clarno and Spray are rocks from the Cretaceous Period (144-65mya). These rocks produce a moderate amount of invertebrate fossils (primarily shell fish (mollusks), though a few rare joint-legged creatures (arthropods) and even more rare vertebrates have been located). This same area produces some Pleistocene fossils (less than 2 mya) as well. The Prineville District office has on display a mammoth tusk removed from a creek within this area. Other Pleistocene fossils (bison) have been reported in the upper stretches of the South Fork John Day River. Pliocene fossils (5-2mya) also have been reported from the northern portions of the John Day basin near the Columbia River (Fremd et al. 1994; Orr and Orr 1999).

There are 155 known fossil localities on BLM managed lands in the John Day planning area that are co-managed, through interagency agreement, by the NPS/BLM. The majority of these localities are known to occur in rocks that produce or are highly likely to produce noteworthy examples of vertebrates, invertebrates and plant fossils. There are additional localities, some older and some younger, that are known but have not been recorded. There are, however, no known paleontology localities within the Baker RA portion of the planning area.

## TRENDS

The volcanic lava flows covered and preserved much of the older sediments in the John Day basin from erosion. The lava cap is the principal reason fossil resources and their geologic contexts are so well represented in the basin. Erosion is both friend and foe to fossil management. Erosion exposes fossils to the elements which begins a fairly rapid process of deterioration but also reveals them for study.

# PEOPLE TODAY IN THE JOHN DAY BASIN

The remainder of this chapter describes how people use the many resources of the John Day Basin. The initial discussion focuses on the Social and Economic Context then the discussion addresses a series of uses and management categories that are important considerations for the decisions to be made in during the John Day Basin RMP planning process.

## SOCIOECONOMIC CONTEXT

The planning area is primarily composed of three Oregon counties – Grant, Wheeler and Gilliam. Portions of several other counties also occur within the planning area to a much lesser extent: Baker, Jefferson, Umatilla, Sherman, Wasco and Morrow. Wheeler and Grant counties are contained almost entirely within the John Day Basin and draw their social and economic character from the planning area. Gilliam, Sherman, Wasco, Morrow and Umatilla counties include portions of the Interstate 84 corridor and benefit from the more diverse social and economic opportunities a thoroughfare of this nature offers. Jefferson County has closer social and economic affiliations with the Central Oregon area. The following description of the John Day Basin social and economic environment will focus more on the counties contained within the John Day Basin (Grant and Wheeler), that function within that geographic context. These counties reflect similar trends and values in the remaining counties that make up small portions of the planning area.